Degree Project

Master’s

The economic impact of sports mega-events

The case study of the FIS Nordic World Ski Championship
Falun 2015

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Abstract:

Since the second half of 1990s, the economic impact of sports mega-events concerned the researchers, the public and the professionals. The investment of public funds and the effects on several sectors of the economy motivate the economic impact studies. The economic impact of the FIS Nordic World Ski Championship Falun 2015 to the region of Dalarna is the topic of this thesis. This requires the calculation of direct, indirect and induced economic impact. Within the analysis, data from a questionnaire survey conducted on seven different days during the event are used. The final sample of the analysis contains 893 observations. The segmentation approach was applied for the calculations and the visitors were classified regarding their choice of accommodation. The regional economic impact is calculated at 321 M SEK and the employment effect on the tourism sector is estimated. However, the lack of information limits the study. The analysis could be extended with an accurate investigation of certain issues. Further, the impact of the event should be estimated from all the perspectives. The organization of sports mega-events creates tangible and intangible effects to the host-city. The thesis reviews literature on the economic impact studies of sports mega-events. The results of the study can be used for a comprehensive analysis of the case study. Further, the professionals of the tourism and the event could be benefited.

Keywords: sports mega-events, economic impact analysis, segmentation approach, World Ski Championship Falun 2015
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List of abbreviations and acronyms

CBA- Cost Benefits Analysis
CGE- Computable General Equilibrium
DEA- Direct Expenditure Approach
EIA- Economic Impact Analysis
FIS- International Ski Federation
FIFA- International Federation of Association Football
GDP- Gross Domestic Product
I-O- Input Output
IOC- International Olympic Committee
SEK- Swedish krona
1. Introduction

The economics of sports and the analysis of sport events were introduced by the 1950s in USA. The momentum of the research on the topic was increased after the half of the 1990s (Andreff and Szymanski, 2009). The economic impact studies refer to the organization of every event, regardless the size and the type. This thesis attempts to estimate the economic impact of sports mega-events using the case study of the FIS Nordic World Ski Championship Falun 2015. The segmentation approach will be applied in the analysis. This approach is a popular application of the Economic Impact Analysis (EIA), which is one of the basic methodologies in the economic impact studies of sports mega-events.

The organization of the World Ski Championship is the largest event, under the guidance of the International Ski Federation (FIS). In 2015, it was the fourth time for the city of Falun to host the FIS Nordic World Ski Championship. The host-city is the largest municipality of the Dalarna region, with an approximate population of 60000 inhabitants (Falun municipality, 2016). The first organization of the World Ski Championship in Falun was held in 1954. Nowadays, Falun owns one of the most modern sporting facilities, the Lugnet arena, which was the main venue of the World Ski Championship at the organization of 2015 (Falun municipality, 2016). The organization of the event attracted 281600 visitors (FIS, 2015).

The hosting of sports mega-events is assumed as an opportunity of growth and improvement for the host-city. In addition to this, the turnover of the organization of sports mega-events is considered as positive for the local economy (Shipway and Kirkup, 2012). Furthermore, these events develop the tourism sector in the host-city. Thus, the organization of such events constitutes one of the latest trends in sport event tourism (Getz, 1997). These events require investments, which are, usually, funded by public money (Preuss, 2005; Kasimati and Dawson, 2009). The local society must be convinced that the organization of the event will be beneficial for the local economy. Otherwise, the funds required for the event could have been spent for other projects (Crompton, 1995). The investments of public funds and the growth of tourism sector determines the motivation for research on the economic impact of these events.
The purpose of this study is to estimate whether the organization of the event had a positive economic impact on the host-city or not. This contains the calculation of direct, indirect and induced economic impact. The analysis will measure the economic contribution within the host-city. The research is necessary for the evaluation of the organization of the event and the improvement of future organization of similar events. The data for the study were collected at the venue of the event, by a self-complete questionnaire, during the games on February 2015. In the process of estimating the induced economic impact, additional information was used from the report of IPSOS (2015).

The second chapter of the paper reviews previous economic impact studies of sports mega-events. Further, the demand for sports mega-events is defined, the economic impact analysis method and its popular applications are described in the third chapter. The next chapter of the study contains the empirical analysis of the case study. The direct and indirect economic impact are calculated and the employment effect in the tourism sector is estimated. The analysis is discussed and conclusions are presented at the final chapter.
2. Literature review

The relationship between sports and tourism constitutes the Sport Tourism sector, which is defined as “leisure-based travel that takes individuals temporarily outside of their home communities to participate in physical activities, to watch physical activities, or to venerate attractions associated with physical activities” (Gibson, 1998, p.49). According to Getz (2013) sports offer unlimited occasions for the organization of events and form an incentive for travelling. The analysis of sport events has always been in the interest of many researchers and has resulted that tourism has been the common factor in the organization of events (Getz, 2008). Since 1984 and the Olympic Games of Los Angeles, where the success of the event contributed in the improvement and the development of the organization of such events, the sports mega-events are connected with the term Hallmark events (Lenskyj, 2015). As Ritchie (1984, p.2) stated the Hallmark events are “major one-time or recurring events of limited duration, developed primarily to enhance the awareness, appeal, and profitability of a tourism destination in the short and/or long term”.

The term sports mega-events describe the organization and hosting of events with unique characteristics, that provide legacy, occur for a certain and limited duration and attract the attention of the crowd and the media (Roche, 2006). The effects of the event to the host-city in culture, economy, politics and society formed the incentives of research on the topic. Besides the researchers, the analysis of the significance of sports mega-events to the local society and economy has concerned the professionals and the public sector. Initially, the professionals that are related to the event, such as the event-planners, need an impact analysis of the event for decisions, required adjustments and evaluation of their projects. Further, the impact analysis concerns other professionals regarding the effect of the event on their business. For instance, tourism related business might require resources and improvements or a local business could benefit from sponsoring the event. In addition to this, the aspect of the inhabitants is crucial in order to evaluate the organization of the events. Hence, the economic impact studies of the sports mega-events are important for the decision making process in several sectors. The following of the chapter includes the usage of the event for cultural, political and economic purposes and the effects of the event on the host-city with the review of previous studies.
2.1 The history of sports mega-events

Through the long history of sports mega-events there are several examples where the events deliver key messages worldwide (Black, 2007). Starting from the Ancient Olympic Games in Greece and the tradition of the “Olympic Truce”, until nowadays sports mega-events promote several meanings regarding pride, power, wealth, security, economy and politics (Mexico 1968, Munich 1972, France World Cup 1998, Beijing 2008) (International Olympic Committee (IOC), 2016; International Federation of Association Football (FIFA), 2016; Gibson, 1998). Nevertheless, as a result of the globalization, the range of the event worldwide and the number of visitors, the organization of sports mega-events leads to development opportunities in the economy and other sectors, such as tourism (Roche, 2012).

Today, the planning and organization of sports mega-events consists of policies and tactics which will boost the local economy (Gibson, 1998). Horne (2007) indicates that there are three basic reasons that explain this tendency for organizing sports mega-events, the revolution and development of technology and media, the opportunities for sponsorships and investments and the marketing in order to increase the demand for other commodities, such as tourist attractions. According to Black (2007) the main purpose of such events is to centralize the whole world attention at the host-city. This will promote the status and advertise the city as a tourism destination and, thus, the local economy will be benefited. Hence, the focus of the majority of the studies was on the economic impact analysis of the sports mega-events (Gibson, 1998).

2.2 The economic impact for the host-city

The reputation of those events attracts a huge amount of visitors and tourists in the region. The attendees are, somehow, engaged with the sports and follow the events or use the opportunity to visit the host-city. Further, the events are covered by the media, which make the event and the host-city accessible worldwide. Finally, these events require the involvement of the local society. However, the organization of sports mega-events includes a long time procedure, due to the fact that this type of events has specific requirements and high standards. The organization of sports mega-events affects the host-city in the short and long-term, starting from the award of the organization (Kasimati, 2003). Yet, as a result of the trend of organizing the events in developing countries or rural regions, every economy and market is different. Moreover, the uniqueness of sports mega-events is remarkable. Thus, the analysis of each case
should be adjusted with respect to its characteristics (Malfas et al., 2004).

The economic studies in the topic of sports mega-events investigate these dissimilarities. Recently, the view that has prevailed is that the organization of sports mega-events is advantageous for the host-city. For example, the organization of the FIFA World Cup 2002 in South Korea benefited the country socially and culturally. The research showed a positive impact for the economy and an improvement for the national security (Kim et al., 2006). Additionally, the Summer Olympic Games 2004 in Athens, Greece, boosted the economy of the whole country. The tourism sector was regenerated and is, continuously, growing since that summer. Furthermore, as a result of the organization of the games, a new airport and a modern metro system were constructed. Nevertheless, the organization of the Games exceeded the budget of the plan and additional public funds were required. Only the security of the Games cost to the Greek government 1.1 billion euros (Kasimati and Dawson, 2009).

On the other hand, the organization of sports mega-events is under critical consideration. The huge amounts of money that are required for hosting the event, which are, commonly, driven from public funding, and the actual benefits of the host-city are questioned (Kasimati and Dawson, 2009). “Hosting mega-events such as the Winter Olympics requires considerable investment of human, financial, and physical resources from host communities (Haxton, 1999)” (cited by Gursoy and Kendall, 2006, p.605). The criticism is concentrated on the certain patterns that the organization of sports mega-events follows, as a result of the high standards that the international organization committees set. Furthermore, the unrealistic predictions of the impact of the event, often lead to excesses (Barclay, 2009). For instance, the Summer Olympic Games 2008 in Beijing, China, benefited the economy of the city, with an increment at the revenues of tourism industry and the tourism-related businesses. Nevertheless, for the entire country the organization of the Games resulted to a slight economic impact (Li et al., 2013). In addition to this, the case of the Winter Olympic Games 2014 in Sochi, Russia, although, they managed to boost the economy, they did not exceed the expectations and the organization was expensive (Müller, 2014).
3. Theoretical framework

The sports mega-events are considered as planned actions, which will boost the local economy and will provoke benefits for the host-city (Dwyer et al., 2005). The measurement of the level of the economic significance of those events is, commonly, conducted with economic impact studies. The two main methods of evaluating events are the Economic Impact Analysis (EIA) and the Cost Benefit Analysis (CBA). Some researchers stated that the concepts of the methods are strictly different and thus they should be used depending on each case (Burgan and Mules, 2000). However, the two methods can be used for the extensive research of every case study.

The CBA is an application of welfare economics and investigates the effects of the event to the local society and the host-city. Following the concept of the maximization of utility, the process contains the monetization of costs and benefits. The aim is to identify the project that has the best outcome for the inhabitants among the several alternatives (Dwyer et al., 2016). The CBA method can evaluate a project and determine its acceptance or rejection (Kesenne, 2005). Nevertheless, the researcher should be precise while defining costs and benefits. Further, the duration of the project is crucial for an accurate CBA. On the other side, the EIA measures the economic result for the city from the organization of the event. The method depends on the visitors’ spending within the host-city (Dwyer et al., 2016). The expenditures of the visitors are explained by the consumer demand theory (Downward and Lumsdon, 2000). This chapter defines the demand for sports mega-events and the concept of visitors’ spending. Further, the EIA is introduced, while the most popular applications are described.

3.1 The demand for sports mega-events

The method of EIA analyses the expenditures of the visitors in an event and estimates the economic impact for the host-city. The spending of the visitors depends on the demand for the events. Getz (2013) mentioned that there are two types of demand in the event tourism concept, the direct demand and induced demand. The individuals that travelled owing to the event, either they participated, worked or simply attended the event, establish the direct demand for the event. Further, the induced demand depends on the size and the significance of the event. The case of sports mega-events is as an exception owing to the unique characteristics that are concentrated in this type of events.
The simple demand theory implies that there is a level for the demand of the good in the market, which is affected by several features. The equation 1 presents the relation of the quantity demanded with the price of the good, the income and the preferences of the consumers:

\[ q = f(p, I, T). \]  

In equation 1, \( q \) is the quantity demanded, \( p \) the price, \( I \) the income and \( T \) the preferences of the consumers (Downward and Lumsdon, 2000). In other words, the quantity demanded for a good or service is affected by the changes in price, income and preferences. In the context of the economics of sports mega-events, the event forms the good demanded. The demand for the event is measured from the attendance of the visitors at the event. Further, the factors that constitute the demand for the event are explained by the behaviour of consumers. The remarkable in sports mega-events is the limited duration. The behaviour of the consumers is examined for a certain time period (Borland and MacDonald, 2003). This results in the omission of the price effect from the analysis (Brida and Scuderi, 2013). The price is a factor, which remain constant in the short term. Further, the application of tourism sector, whose goods and services are considered as complements to the demanded good, requires investigation (Downward and Lumsdon, 2000).

The usage of the “Engel curve” confronts the problem and express the demand for sports mega-events. The “Engel curve” depicts the effect of the consumption of a certain commodity to the income of the consumers subjected to budget restrictions (Seale et al., 2012). Hence, the demand will be represented by an equation, in which the total expenditures of the visitors for the duration of the event equals the demand for the good adjusted by a fixed multiplier (Brida and Scuderi, 2013). A consideration of the factors that affect consumers demand is required while defining the model (Downward and Lumsdon, 2000).

The theory distinguishes the possible factors of influence in five categories. These include preferences, budget according to the available goods and services, expectations of services, significance and size of the event (Borland and MacDonald, 2003). Simons (2006, p.79) indicates that the other factors that affects the demand for sports events, besides price, income and preferences of the consumers, are “the price of substitute goods, the market size, the importance of the contest and the closeness of the competition”. Further, there is a
congested list of complementary goods, both tangible and intangible. The quantity demanded for sports mega-events can be measured by collecting data of the visitors regarding the determinants of the demand function. In these surveys the important aspect is to define the profile of the visitors and to distinguish the spending categories (Cannon and Ford, 2002). If the total expenditures of the visitors are defined by S (Spending), I as income, T as preferences and $\mu$ as all the special characteristics of the individuals that cannot be determined or measured that influence the spending of the visitors (Downward and Lumsdon, 2000), the equation 2 illustrates the consumers’ demand for sports mega-events

$$S_i = \alpha + \beta_1 I_i + \beta_2 T_i + \mu_i$$  \hspace{1cm} (2).$$

The variable Spending $S_i$ contains the total expenditures of the visitors that is related with the event, such as the costs for tickets, transportation, accommodation and many more. The preferences of the consumers concern the choices of the consumers to the accessible complementary goods or services. The context of unexplained factors includes the motives for spending by the consumers that cannot be measured or not included in the survey. For instance, sudden feelings of excitement, pleasure, joy or pride to the visitors while attending a sports mega-events, such as the Olympic Games, cannot be measured.

### 3.2 The economic impact analysis

The current studies on the economic impact attempted to monetize the event, in order to be understandable for everyone (Getz, 2000). The economic impact, as stated by Crompton and McKay (1994, p.33), “is defined as the net economic change in a host-city, excluding non-market values, which results from spending attributable to the event”. This economic change is, usually, referred as the “new money” that entered the local economy (Dwyer et al., 2000). In order to estimate the actual size of the impact of the event, the researcher should emphasize to the special characteristics of every event, such as the place or the type of the event (Dwyer et al., 2000). In addition to this, precise methods of collecting the data are required (Burgan and Mules, 2000). The economic impact studies measure the changes in the local economy, which are linked to the organization of the sports mega-events (Diedering and Kwiatkowski, 2015) Moreover, the effects on other sectors, such as employment, tourism industry, interest rate and gross domestic product (GDP) can be estimated (Kasimati and Dawson, 2009; Müller, 2014; Madden, 2002; Kim et al., 2006).
The EIA consists of three elements, the direct, the indirect and the induced economic impacts (Miller, 2007). Yet, for a comprehensive analysis the event should be investigated in the long term (Müller, 2014). The purpose of the economic impact studies is to measure the “new money” that entered the local economy. Thus, the expenditures of the locals must be excluded from the analysis. These amounts already exist in the local economy. Hence, the economic impact measures the spending during the event by the visitors attending or involve at the event, without the expenditures of the locals.

The direct economic impact describes the changes in the economy as a result of the event. In other words, the direct economic impact contains the consumption of goods and services that are connected with the event (Kasimati, 2003; Siegfried and Zimbalist, 2006; Miller, 2007). An example of direct economic impact is the revenues from the tickets of the event. Further, during the attendance of sports mega-events the visitors are provided with a plethora of goods and services. The amount of the expenditures of the visitors within the host-city during the event, when the goods and services are not related with the event, represent the indirect economic impact. In other words, the indirect economic impact describes the inflow of “new money” in the economy resulted in additional financial activities to the local businesses. The indirect impact is terminated when the effect of the “new money” decreases (Kasimati, 2003; Miller, 2007). The direct and indirect impact result to a change in the level of the income of the locals. The event is considered as a shock to the local economy (Dwyer et al., 2016). The changes in the consumers’ behavior of the locals due to the event are included in the induced impact of the event. Moreover, the induced impact consists of effects in several sectors. The creation of employment vacancies and business opportunities for the local economy are described by the induced economic impact. Respectively, with the indirect impact, the duration of the induced impact ends when the amount of spending by the locals vanishes (Miller, 2007).

During the process, some considerations are required. Initially, as it is mentioned above, the expenditures of the local visitors at the event must be excluded from the analysis. In addition to this, the expenditures of the regular visitors of the host-city must be excluded. The regular visitors are classified to “casuals” and “time-switchers”. The “casuals” are the tourists of the host-city that would spend in the local economy. Their expenditures at the event would have occur in another sector of the local economy. The “time-switchers” are visitors that intended to visit the host-city at some time and combine their visit with the event. Their
expenditures must be excluded from the analysis, because they would exist at a different time period. Moreover, the analysis should be conducted with the measure of income, instead of sales. The sales estimate the change in the economic activity. In contrast, the changes on the level of the local income is estimated by the measure of income. The latter is of the interest of the public, the researchers and the authorities. Finally, the analysis regarding the effects on the employment must be critical. The errors arise when the amount of fulltime and part time jobs that are created is not defined and the analysis assumes that the event will create new jobs. Often, the existing employees extend their working hours to cover the needs of the business. The event will last for a certain period. Finally, a comprehensive analysis investigates whether the human resources originate from the region or not (Crompton et al., 2001; Preuss, 2005).

Additionally, there are some other limitations that might cause miscalculations. The expenditures of the visitors that did not remain within the host-city are considered as ‘leakages’ (Crompton and McKay, 1994). In the context of the economic impact of sports mega-events the ‘leakages’ occur inside and outside the venue of the event. As Barclay (2009) mentioned, the development of sports events industry, made the events an international market. The organization committees of these events, such as the IOC or FIFA, have co-operation with certain sponsors, who ensure access within the venue of the event and provide their products or services. Further, there are occasions where goods and services from suppliers outside of the region are available inside and outside the venue of the event. Finally, when the event is held in a developing area, the requirements of the organization are covered with the usage of resources from outside the region. For all these reasons, the investigation of the ‘leakages’ is required.

Finally, another issue that needs to be considered is the double counting. This term describes the errors in the measurement of the economic activity. The issue appears when the distinction of the visitors is not explicit and this results one individual to belong in several categories. The number of visitors and their expenditures will increase and this will overestimate the outcome (Burgan and Mules, 1992). The certain assumptions during the analysis vanish the issue of double counting (Ostergaard et al., 2016).
3.3 Methods of EIA

During the years several approaches have been developed for the measurement of the economic impact. The multiplier analysis, the computable general equilibrium (CGE), the direct expenditure approach (DEA) and the segmentation approach are some of the most popular methods of EIA. Moreover, the economic impact studies are, frequently, conducted with other simulation econometric models, due to the limitations of each methodology (Davies et al., 2013). The main argument among the researchers regards the most appropriate method. The selection of each method depends on each case characteristics and the type of the available data (ex-ante, ex-post). The continuation of this section describes the basic methods, referring to previous studies for practical application.

3.3.1 The multiplier analysis

The multiplier analysis is one of the most popular methodologies in the context of economic impact studies (Archer, 1984). The basic concept of the multiplier analysis defines that there will be changes in the local economy after the entry of foreign funds due to the occasion of the event (Crompton and McKay, 1994). The process consists of calculating the direct, indirect and induced impacts by expressing the alterations at the local economy from the total amount of the expenditures of the visitors. As discussed above, the direct economic impact contains the expenditures of the visitors that are linked to the event, the indirect impact includes the effects on the secondary sectors and the induced impact contains the increase of the consumption of the locals, as a result of the new level of income (Gratton et al., 2000).

The multiplier analysis is directly connected with the Input-Output (I-O) method, which was introduced and explained by Leontief (1936 cited by Miller and Blair, 1985, p.1). The method is based on that every change in an industry is the result of the changes in the other industries, due to the assumption that the economy should be treated as one system (Miller and Blair, 1985). In simulation, if the organization of an event in an economy is assumed as a shock, the economic impact of the event to the local economy can be estimated using the I-O models (Blake, 2005). In other words, the evaluation of the influence of a relative change to the local, regional or world economy can be explained with the usage of I-O models (Bess and Ambargis, 2011).
In practice, the I-O models describe the status of the economy, which consists of a certain amount of sectors and products and these are represented by a set of simple equations. The interaction among the several sectors of the economy results to the total demand in the economy (Blake, 2005). The I-O models are based on extremely strict assumptions. First, there are no restrictions and constraints in the supply of resources and outputs. Moreover, there are no changes in prices and the unemployment does not exist. Finally, the cost for the government is unexplained and fixed and the final demand is computed arbitrarily (Dwyer et al., 2005). The I-O tables includes the costs for each industry in order to use a certain product, as well as the total demand for each product in the economy. Obviously, due to the fact that the usage level of a product differs among the industries, there are some zero values at the tables (Blake, 2005; Lee and Taylor, 2005). In the case of events, the household sector holds a key role. Further, the analysis investigates the effects of the tourism sector to the economy, due to the fact that the event is considered as a tourism commodity and the calculations are based on the expenditures of tourists (Crompton and McKay, 1994). Consequently, the equation that could describe an I-O model of an event will contain, the sectors of the economy, the variables that were used in the model, the total outcome and the final demand. To illustrate this, Lee and Taylor (2005, p.598) used the following model

\[ X = AX + Y - M, \]  

where \( X \) is an nx1 vector of total gross output, \( A \) is an nxn matrix of input coefficients including household sector, \( Y \) is an nx1 vector of final demand, and \( M \) is an nx1 vector of imports”. In other words, the I-O models contains a set of equations, which describes the trades among the several parts of the economy. These equations express the relationship of every industry and sector with the other industries and sectors of the economy. The derivation of the multipliers for each industry occurs based on these equations.

The multiplier analysis establishes criteria to separate the sectors of the market. The sectors are distinguished according the effects of the event, primary and secondary (Dwyer et al., 2010). Hence, the primary effects measure the direct economic impact and the secondary the indirect and induced economic impact, respectively. During the I-O analysis, a sample of data is used to estimate the multipliers of each part. Then, the percentage of the visitors of the event is calculated, excluding the local visitors, and the multiplier is applied. The direct economic impact is computed based on the expenditures of the visitors. Further, the indirect and induced economic impact are calculated with the various multipliers of the sectors.
Nevertheless, although the process was very famous the previous years, lately, the models are characterized as inadequate and the method is rejected (Dwyer et al., 2005). The I-O models exclude from the analysis the interactions among the sectors of the economy that will occur from the shock (Blake, 2005). Additionally, the I-O models estimate, only, zero or positive impacts to the local economy. The method does not observe any negative outcomes. In practice, the organization of sports mega-events affects the entire local economy. Some sectors might have positive impact, some negative and some neutral. Hence, the results of the I-O analysis, always, deviate from the reality and, often, overestimate the effects of the event to the local economy (Dwyer et al., 2006).

### 3.3.2 The Computable General Equilibrium (CGE)

The Computable General Equilibrium (CGE) models are considered as the innovation in regional economics and are, commonly, used in the EIA of tourism and events (Dwyer et al., 2000; Dwyer et al., 2004; Blake, 2005). The limitations of the I-O method leaded to the invention of the CGE models (Dwyer et al., 2006). The theory of the CGE follows the concepts of the I-O analysis. Similarly, the economy of a city, a region or the world is considered as a whole, the elements (sectors, industries, etc.) of which are characterized by significant relationships and the main purpose is to maximize utility (Rumler, 1999). Hannum (2015, p. 363) stated that “any CGE model can be converted into an I-O model by setting substitution elasticities in the constant elasticity of substitution (CES) production and utility functions to zero and making factor supply elasticities infinite” and, thus, several CGE studies use the I-O tables as their data (Hosoe, 2014).

The current studies regarding tourism issues worldwide are, mainly, conducted with the CGE models (Li et al., 2011). The EIA with CGE models is characterized by three sections, the calculation of the change in the local economy, due to the special event, the construction of the model and the injection of the change inside the model (Li et al., 2011; Li et al., 2013). The model includes assumptions for the resources of capital and land. In addition to this, the labour is considered as perfectly elastic or with zero elasticity. Moreover, the price is subjected to the substitution effects and the cost of the government is kept fixed. The models use theories and examples to analyse the final demand (Dwyer et al., 2005). These assumptions offer the model a very important advantage. The production of more realistic results and, consequently, avoid
the overestimation of the economic effects of an event (Madden, 2002). In addition to this, the accuracy of the outcomes of the CGE models resulted from the ability to include in the analysis the negative effects and the estimates of more sensitive variables, such as the prices (Blake, 2005).

In general, the sophisticated pattern that CGE models follow, characterize them as very complicated and incomprehensible. The extensive database and the set of mathematical equations cover multiple restrictions and produce unexplained results. The difficulty in understanding the results is the absence of accurate source (Wing, 2004). This is caused by imperfect information which made reproduction of the results impossible (Hannum, 2015). Two methods are adopted from the majority of the researchers for the solution of CGE models, the non-linear programming approach and the derivative approach (Rumlner, 1999). The existing literature does not provide the process of conducting the CGE modelling. There are limited studies that present the complete database and the system of equations. This issue is, commonly, caused by the size and the complexity of the analysis (Böhringer et al., 2003; Wing, 2004). However, Partridge and Rickman (2010) in their attempt of approaching the application of the theory in practice, presented the elements of the model. The theoretical path in modelling of CGE method is as follows, “one derives the total differentials of the market equilibrium conditions and solves this system of equations for the relative changes in the variables of interest” (Böhringer et al., 2003, p.2). Yet, from the theory to the application a relative difference is observed. This is resulted by all the possible alternatives that potentially occur in an actual economy and cannot be predicted from the theoretical scope (Böhringer et al., 2003). Nevertheless, the CGE models produce accurate estimations and also include negative effects (Dwyer et al., 2004).

The extensive usage of CGE models has been criticised regarding their complexity (Dwyer et al., 2006). The method requires advanced programming skills in order to test the model or change the assumptions (Böhringer et al., 2003; Hannum, 2015). Moreover, the CGE models are expensive and time consuming (Dwyer et al., 2006). The comparison of the methods indicated the advantage of CGE models in separating the economy in parts. The CGE models are capable to identify the impact of the event in different sectors or industries. In contrast, the I-O models investigate the economy as a whole. Hence, the CGE models provide more realistic results of the economic impact of the event. The estimates avoid measurement errors and the results are more precise (Dwyer et al., 2006; Hannum, 2015).
3.3.3 The Direct Expenditure Approach

A method that is, lately, selected by the researchers, due to the fact that the analysis focuses on the event, is the Direct Expenditure Approach (DEA). The objective of the method is to estimate the revenues in the host-city owing to the organization of the event. Furthermore, the DEA is also preferred by the private and public sector, due to the targeted process (Davies et al., 2013; Diedering and Kwiatkowski, 2015). The rationale of the DEA method is based on the occasions of events, where the information and details are not available, or is difficult to acquire. For instance, the multiplier analysis and the CGE models, often, use information from other studies and this leads to measurement errors. In contrast, the DEA is a feasible technique that investigates the entire event. The method evaluates the economic activity that is related to the event, considering the limitations and obtaining academic validity (Davies et al., 2013). In addition to this, the results can be reproduced and, moreover, the method is used for the comparison of several organizations of the same event (Diedering and Kwiatkowski, 2015).

Nevertheless, during the process there are some obstacles, which can result to miscalculations and rejection of the method. The analysis depends on key factors, which must be defined. The distinction of the visitors in tourists and locals and the geographical boundaries of the host-city are basic factors (Davies, 2013). Certainly, the DEA method sustained criticism from some economists, besides the academic and the practitioners support. Abelson (2011) mentioned that there are basic limitations on the DEA method. Initially, there is no analysis regarding the resources that are consumed by the visitors and, moreover, there is no investigation at the ‘leakages’ in the economy.

3.3.4 The segmentation approach

The economic impact models construction depends on visitors’ spending. Both I-O and CGE models estimate the direct, indirect and induced impact from the expenditures of the visitors (Sun et al., 2010). The economic studies for visitors’ spending follow a pattern, in which the economic impact is computed by multiplying the total number of visitors with the average spending (Sayman et al., 2005). This approach is straightforward and often leads to overestimations, owing to that the spending style is assumed to be similar for all the visitors. The discrimination of the visitors depending on their preferences introduced the segmentation approach. Smith (1956) claimed that the division of the markets in smaller parts will produce
more effective results. The segmentation approach predicts more realistic outcomes, due to the fact that the visitors are categorized based on their spending profile (Stynes and White, 2006).

Kotler (1980) provides an outline of four criteria (demographic, geographic, psychographic and behavioural) regarding the distinction of the consumers. A review on previous studies by Tkaczynski et al. (2011) indicates that the research in the event studies is based on these criteria. The majority of the previous studies followed this guideline and applied a combination of these criteria in their surveys. The research on the topic consists of six different methods of collecting information. The visitors’ surveys or the combination of this method with other techniques is the most popular choice of the researchers. Further, the data collection process in the recent studies defines twenty-four variables as the most effective. These variables attempt to establish a description of the general profile of the respondents and their spending habits. The visitors are, commonly distinguish regarding age, place of origin, level of income and level of education. There are no restrictions of the variables that can be the base of segmenting the market (Dolnicar, 2004). However, the market is usually segmented by the choice of accommodation or the transportation type (Stynes and White, 2006). It is assumed that the visitors with the same preferences in basic factors, such as the mean of transportation or the accommodation type, will express similar needs. The segmentation approach adjust the goods and services supplied based on the demand of the specific groups (Dolnicar, 2004).

In practice, the segmentation approach is based on two methods that include the suggested characteristics. The first, the common sense distinction, classifies the visitors a priori, based on the characteristics of the visitors and following logical and normal standards. On the other hand, the second method categorizes the visitors based on collected information (Dolnicar, 2004). The first method is based on general behavioural statistics of the consumers. The visitors are classified based on their reality and routines. The second method, although it is widely used, focuses on specific tourism goods and services and does not cover the various factors that influence the consumption of visitors (Gonzalez and Bello, 2002).
4. The case study of FIS Nordic World Ski Championship Falun 2015

The opening ceremony of the Nordic World Ski Championship Falun 2015 was on the 18th of February. During the event, 714 athletes from 57 nations participated at the games and 1600 volunteers were involved. Further, the surprising amount of 281600 spectators is estimated that attended the games and in total 228000 tickets were sold. Moreover, the championship was broadcasted in more than 20 countries by 1250 media representatives. In addition to this, the social media promoted the event worldwide and the Facebook page of the event collected 46000 likes (FIS, 2015). Besides the competition part, plenty of events were organized at the city to entertain the visitors. Within the 12 days of the event, the local economy was affected from the purchases of the visitors.

There are certain assumptions that we need to consider in the process of measuring the economic impact of the event to the local economy. To begin with, we need to define the host-city, in the context of geographical boundaries. The city of Falun was the place of the organization of the event. However, the advanced requirements of the organization of the event, involved the whole region of Dalarna and, especially, the cities next to Falun. For example, the media representatives stayed at the city of Borlänge, which is situated 24 km away from the city of Falun. Within this study, there is an attempt to estimate the regional economic impact. By the scope of this analysis, the region of the study is defined using an online map (see Appendix 1) and as the host-city is considered the region of Dalarna. Consequently, as local economy is considered the region of Dalarna, the inhabitants of Falun are considered as local visitors and the inhabitants of Dalarna as regional visitors.

The economic impact analysis of FIS Nordic World Ski Championship Falun 2015 case study will be conducted with the application of the segmentation approach. Initially, the findings of the data are presented. Subsequently, the regional economic impact is measured. The estimates concern the direct and indirect economic impact of the event at the local economy. In addition to this, there is a guideline for the induced economic impact and an estimate of the employment effect on tourism sector. Within this paper, the economic estimates are expressed in Swedish krona (SEK)$^1$ and the amounts include taxes.

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$^1$ EUR/SEK= 1/9.33378
4.1 The data

The case study is based on visitors’ data, collected by a survey on the site of the event, conducted by Heldt (2015). More concretely, the respondents had to complete, individually, a questionnaire. It contained information regarding personal details, travelling and lodging types, expenses inside and outside the venue of the event, expectations and satisfaction of the event. The survey was conducted on seven random days and the total amount of the respondents is 893.

The survey indicated that the 76.5% of the visitors were tourists and the 23.5% were visitors from the region of Dalarna. The 12.7% of the total amount of visitors were locals. Further, female and male visitors had almost the same percentage in visiting, 49.8% and 50.2% respectively. The visitors were separated in four different age categories (under 18, 19-29, 30-45, 46 and over), with the two last categories contained the majority of the guests, 78.4% and, furthermore, almost the 50% is over 45 years old. The education level of the respondents is considered as high, due to the fact that the 63% has taken higher education. In addition to this, young people are included in the sample, whose education is not completed yet. The organization of the event succeeded to meet the high level of expectations of the guests, with the majority of the respondents leaving the event extremely satisfied. In addition to this, it is remarkable that the 98.4% of the respondents have attended previous world championships, which indicates that the visitors were experienced in such events. The visitors selected various types for transportation and accommodation. More precisely, the majority of the visitors travelled to the destination by car, as a result of the location of the destination and the season. As for the choices in accommodation type, the visitors selected more than seven types of accommodation with the share presented in Appendix 2 (Figure A1).

4.2 The visitors’ economic contribution

The economic impact of the event is estimated based on the expenditures of the visitors during the event. Initially, the calculation of the total economic contribution is conducted. Further, the economic contribution of the regional visitors is subtracted and the economic contribution of tourists is estimated. From this amount, the direct and indirect economic impacts are calculated. Prior the calculation of the economic contribution of the visitors, the definition of the variables is required.
Tourists and Regional visitors
The definition of the region distinguishes the visitors to tourists and region visitors. Within the analysis as tourist is considered every individual outside the region of Dalarna. The official report (FIS, 2015) estimates 281600 total visitors at the event. Thus, the amount of tourists is estimated in 215424 visitors and the region visitors 66176. The amount of local visitors is estimated in 35763.

Expenditures inside and outside the venue of the event
The respondents of the survey were asked to state their consumption inside and outside the venue of the game regarding five specific categories, respectively.

Local trip expenditures
This variable contains the expenditures of the visitors in public transportation and taxi services, for trips within the region.

Tickets Cost
This variable represents the purchases of the visitors for the tickets of the event.

Accommodation
The choice of accommodation is used as the base for the segmentation approach, due to the fact that it is assumed that the visitors with the same type of accommodation will have, on average, similar spending profiles.

Average Daily Expenditures
This variable represents the expenses of the visitors of the event within a day (24h). The calculation consists the expenditures inside and outside the venue of the event.

Number of persons in segment
The number of visitors in each segment was calculated by the percentage of the sample in each segment. More precisely, the percentage of each segment in the sample data was computed and then this number was multiplied with the total number of visitors of the event.
4.2.1 The visitors’ spending

The expenditures of the visitors during the event constitute the economic contribution resulted from the event. The amounts comprise the expenditures of the visitors regarding the provided good and services in the host-city. This paper focuses on five specific spending categories, which are presented in Table 1. The results inside the venue of the event showed that the visitors spent the majority of their budget in Food and Beverage sector and souvenirs. Outside of the venue area, the visitors, mostly, spent money at the Food and Beverage sector, which means that the local-economy was benefited from the event. In both cases, the expenses for ski equipment are really low.

<table>
<thead>
<tr>
<th>Spending Categories</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenses during the day inside the venue</td>
<td>21.8%</td>
</tr>
<tr>
<td>Restaurant and coffee inside the venue</td>
<td>32.4%</td>
</tr>
<tr>
<td>Food and snacks inside the venue</td>
<td>14.4%</td>
</tr>
<tr>
<td>Shopping and souvenirs inside the venue</td>
<td>30%</td>
</tr>
<tr>
<td>Ski equipment inside the venue</td>
<td>1.4%</td>
</tr>
<tr>
<td>Expenses during the day outside the venue</td>
<td>5.6%</td>
</tr>
<tr>
<td>Restaurant and coffee outside the venue</td>
<td>43.7%</td>
</tr>
<tr>
<td>Food and snacks outside the venue</td>
<td>35.7%</td>
</tr>
<tr>
<td>Shopping and souvenirs outside the venue</td>
<td>13%</td>
</tr>
<tr>
<td>Ski equipment outside the venue</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: Own calculation

In Table 2 the expenses of the visitors in the spending categories are included, while the visitors are separated in tourists and regional visitors. The expenditures inside and outside contain the average spending per individual in the categories presented in Table 1. The cost for the tourists is higher in every spending category. This is explained by the fact that the tourists had reasonable accommodation costs. Further, the regional visitors could reduce their expenses of food. Moreover, they had the opportunity to visit the games randomly, while the tourists visited the destination for a specific amount of days. This is the first distinction of the visitors of the event in tourists and regional visitors. The total estimated economic contribution is 764.8 M SEK, with 710.3 M SEK spent by tourists and 54.5 M SEK by regional visitors, as shown in Table 3. There is strong evidence that this result is an overestimation of the final outcome owing to that the visitors are categorized only based on their origin and the other factors that
influence the spending are not included.

Table 2. Estimated total average cost of tourists and regional visitors in SEK

<table>
<thead>
<tr>
<th>Categories</th>
<th>Tourists</th>
<th>Regional Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditures inside</td>
<td>352</td>
<td>202.2</td>
</tr>
<tr>
<td>Expenditures outside</td>
<td>396</td>
<td>167.2</td>
</tr>
<tr>
<td>Accommodation</td>
<td>1602</td>
<td>0</td>
</tr>
<tr>
<td>Tickets</td>
<td>804.5</td>
<td>427.8</td>
</tr>
<tr>
<td>Local trip</td>
<td>142.9</td>
<td>26.8</td>
</tr>
<tr>
<td>Average total spending per individual</td>
<td>3297.4</td>
<td>824</td>
</tr>
</tbody>
</table>

Source: Own calculation

Table 3. Estimated economic contribution by tourist and regional visitors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tourists</th>
<th>Regional visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment Share</td>
<td>76.5%</td>
<td>23.5%</td>
</tr>
<tr>
<td>No. of visitors in segment</td>
<td>215424</td>
<td>66176</td>
</tr>
<tr>
<td>Average total spending per individual (in SEK)</td>
<td>3297.4</td>
<td>824</td>
</tr>
<tr>
<td>Total consumption in segment (millions SEK)</td>
<td>710.3</td>
<td>54.5</td>
</tr>
</tbody>
</table>

Source: Own Calculation

4.2.2 Segmentation approach

For the purpose of this paper, the visitors of the event are categorized based on their choice of accommodation. The lodging types are categorized in seven main segments. The number of individuals for each segment is presented in Table 4. These amounts were calculated using the percentage of each segment on the sample (Appendix 2) on the estimated total amount of visitors from the official report (FIS, 2015).

Table 4. Number of individuals per segment

<table>
<thead>
<tr>
<th>Segments</th>
<th>Home</th>
<th>Family and Friends</th>
<th>Hostel</th>
<th>Rented Cottage</th>
<th>Hotel</th>
<th>Rented house or apart</th>
<th>Other types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>117441</td>
<td>62938</td>
<td>10382</td>
<td>15248</td>
<td>13950</td>
<td>25630</td>
<td>36011</td>
</tr>
</tbody>
</table>

Source: Own Calculation
The expenses of the visitors in each segment are presented in Table 5. The variable Accommodation presents the average daily cost per individual according to the selected segment. It is assumed that the ‘Home’ and ‘Family and Friends’ segments have 0 SEK accommodation cost for the individuals. This assumption resulted from the information of the sample. More precisely, the 96% of the respondents for the ‘Home’ segment and the 90.2% of the ‘Family and Friends’ segment reported 0 expenses for accommodation. Further, the reported accommodation cost for the other segments must be divided by the number of nights that the individuals spent in their type of accommodation. As a result of a large amount of incorrect answers in the survey regarding this question, the total number of days that the visitors attended the event was used, in order to achieve reasonable outcomes. Respectively, the local trip cost is divided with the average number of days for each segment. The total cost for every individual is the summation of the above categories. The distinction of the visitors based on their choice of accommodation estimates the economic contribution based on the spending habits of the visitors.

### Table 5. Estimated total daily spending per individual in SEK

<table>
<thead>
<tr>
<th>Segments/Variables</th>
<th>Home</th>
<th>Family and Friends</th>
<th>Hostel</th>
<th>Rented Cottage</th>
<th>Hotel</th>
<th>Rented house or apart</th>
<th>Other types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation</td>
<td>0</td>
<td>0</td>
<td>735.3</td>
<td>851.5</td>
<td>1309.5</td>
<td>1785.9</td>
<td>656.2</td>
</tr>
<tr>
<td>Daily Expenditures</td>
<td>348.8</td>
<td>520.5</td>
<td>849.8</td>
<td>1181.6</td>
<td>1031.3</td>
<td>1517.5</td>
<td>936.4</td>
</tr>
<tr>
<td>Local trips</td>
<td>139</td>
<td>224</td>
<td>82.8</td>
<td>165.5</td>
<td>229.2</td>
<td>301.1</td>
<td>86.9</td>
</tr>
<tr>
<td>Ticket Cost</td>
<td>505.2</td>
<td>625.4</td>
<td>767.6</td>
<td>829.5</td>
<td>604.5</td>
<td>836.1</td>
<td>889.1</td>
</tr>
<tr>
<td>Total Daily Spending per individual</td>
<td>993</td>
<td>1369.9</td>
<td>2435.5</td>
<td>3028.1</td>
<td>3174.5</td>
<td>4440.6</td>
<td>2568.6</td>
</tr>
</tbody>
</table>

Source: Own Calculation

The Table 6 shows the total contribution for each segment. The outcome of the segmentation approach is rectified, in comparison with the simple distinction of the visitors in tourists and regional visitors. The total contribution for each segment is calculated by multiplying the total daily spending of each segment with the estimated number of visitors in each segment. The total economic contribution is estimated to 524.8 M SEK, by the summation of the outcomes of the segments.
Table 6. Estimated total economic contribution per segment in SEK

<table>
<thead>
<tr>
<th>Segments/Variables</th>
<th>Home</th>
<th>Family and Friends</th>
<th>Hostel</th>
<th>Rent. Cottage</th>
<th>Hotel</th>
<th>Rented house or apart</th>
<th>Other types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total daily spending per individual</td>
<td>993</td>
<td>1369.9</td>
<td>2435.5</td>
<td>3028.1</td>
<td>3174.5</td>
<td>4440.6</td>
<td>2568.6</td>
</tr>
<tr>
<td>Total contribution in segment (millions)</td>
<td>116.6</td>
<td>86.2</td>
<td>25.2</td>
<td>46.2</td>
<td>44.3</td>
<td>113.8</td>
<td>92.5</td>
</tr>
</tbody>
</table>

Source: Own Calculation

Subsequently, the economic contribution of the local and regional visitors is estimated. The economic contributions of the locals and the region visitors are calculated by multiplying the average daily spending with the estimated number of visitors. The expenditures of the locals within a day are presented in Table 7. The average daily spending per individual is calculated at 811.2 SEK. The total economic contribution of the 35763 local visitors is estimated at 29 M SEK.

Table 7. Local visitors’ average daily spending in SEK

<table>
<thead>
<tr>
<th>Categories</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditures inside</td>
<td>131.3</td>
</tr>
<tr>
<td>Expenditures outside</td>
<td>212.9</td>
</tr>
<tr>
<td>Ticket cost</td>
<td>447</td>
</tr>
<tr>
<td>Local trip cost</td>
<td>20</td>
</tr>
<tr>
<td>Total cost per individual</td>
<td>811.2</td>
</tr>
</tbody>
</table>

Source: Own calculation

Additionally, the visitors from the rest of the region of Dalarna (Table 8) contributed at the organization of the event, with augmented expenses inside and outside the venue of the games. The total amount that was spent by the regional visitors reached the 59.3 M SEK by an estimated number of 66176 regional visitors. In this amount the economic contribution of local visitors is included.

Table 8. Region visitors’ economic contribution in SEK

<table>
<thead>
<tr>
<th>Categories</th>
<th>Average</th>
<th>Total (in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditures inside</td>
<td>310</td>
<td>20.5</td>
</tr>
<tr>
<td>Expenditures outside</td>
<td>501.7</td>
<td>33.2</td>
</tr>
<tr>
<td>Tickets</td>
<td>579.6</td>
<td>38.4</td>
</tr>
<tr>
<td>Local trip</td>
<td>97.2</td>
<td>6.4</td>
</tr>
<tr>
<td>Total spending</td>
<td>1488.5</td>
<td>98.5</td>
</tr>
</tbody>
</table>

Source: Own calculation
4.3 Estimating the economic impact

In order to estimate the total regional economic impact, the calculation of the direct and indirect economic impact is necessary. In addition to this, certain adjustments will be applied in correspondence with the assumptions of the analysis. Further, the expenditures of the regional visitors must be excluded from the total amount of economic contribution.

**Total Direct Economic Impact**

The total direct economic impact consists of the “new money” that entered the local economy as a result of the event. By the scope of this analysis, we assume that the expenditures inside the venue of the event constitutes the direct economic impact. The cost of tickets cannot be included in the calculations of the direct economic impact, due to the fact that the revenues of the tickets were collected by the organization committee and not by the host-city. For instance, in the case of a local tournament, the cost of tickets could be included in the estimation of direct economic impact. For this analysis, the visitors’ spending inside the venue of the event consists of the expenditures of the categories that are presented in Table 1. The direct economic impact is calculated in Table 9 for each segment. The visitors are again categorized in segments based on their choice of accommodation, the average spending per individual inside the venue of the event was calculated for each segment and, further, this number was multiplied with the total amount of visitors in the segments from Table 4.

**Table 9. Total direct economic contribution per segment in SEK**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Home</th>
<th>Family and Friends</th>
<th>Hostel</th>
<th>Rented cottage</th>
<th>Hotel</th>
<th>Rented house or apart</th>
<th>Other types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average expenditures inside the venue</td>
<td>331.2</td>
<td>379.2</td>
<td>416.1</td>
<td>744.6</td>
<td>377.8</td>
<td>978</td>
<td>505.4</td>
</tr>
<tr>
<td>Total direct spending (millions)</td>
<td>38.9</td>
<td>23.9</td>
<td>4.3</td>
<td>11.3</td>
<td>5.2</td>
<td>25.1</td>
<td>18.2</td>
</tr>
</tbody>
</table>

Source: Own calculation

The summation of the direct economic impact of the segments results to the total direct economic impact. From this amount, the amount spent by the regional visitors must be subtracted. Table 10 represents the total direct economic impact for the region of Dalarna. The regional visitors’ amount is taken by Table 8. The direct impact is estimated at 106.4 M SEK.
Table 10. The direct economic impact in millions SEK

<table>
<thead>
<tr>
<th>Economic impact</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total direct economic contribution</td>
<td>126.9</td>
</tr>
<tr>
<td>Regional visitors direct economic contribution</td>
<td>20.5</td>
</tr>
<tr>
<td>Total direct economic impact</td>
<td>106.4</td>
</tr>
</tbody>
</table>

Source: Own Calculation

Total Indirect Economic Impact

The indirect economic impact contains the expenditures of the visitors during the event, within the geographical boundaries of the host-city. In this case study, the indirect economic impact consists of the expenses outside the venue of the event, the accommodation cost and the local trip cost. However, the list of these expenditures is very extensive. There is economic impact in every purchase that the visitors conduct. For example, the revenues at the local museums during the days of the event is a significant amount for the tourism impact. The measurement of the indirect economic impact is presented in Table 11, where the spending of the visitors is categorized in lodging segments. The average indirect spending of the visitors consists of the expenses during the day outside of the venue of the event, in the categories that are presented in Table 1, the local trip cost and the accommodation cost for each individual.

Table 11. Total indirect economic impact in SEK

<table>
<thead>
<tr>
<th>Variable</th>
<th>Home</th>
<th>Family and Friends</th>
<th>Hostel</th>
<th>Rented cottage</th>
<th>Hotel</th>
<th>Rented house or apart</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average indirect spending</td>
<td>404.2</td>
<td>582.9</td>
<td>1276.9</td>
<td>1462.5</td>
<td>1956.5</td>
<td>2666.5</td>
<td>1081.4</td>
</tr>
<tr>
<td>Total indirect spending (millions)</td>
<td>47.4</td>
<td>36.7</td>
<td>13.2</td>
<td>22.3</td>
<td>27.3</td>
<td>68.3</td>
<td>39</td>
</tr>
</tbody>
</table>

Source: Own calculation

Respectively, the indirect economic impact is calculated by the summation of the indirect spending of each segment. The contribution of the regional visitors must be subtracted, as well. The calculation is presented in Table 12. The indirect economic contribution of the regional visitors is calculated from Table 8, using the same categories that were used in the
segmentation approach. The indirect economic impact for the region of Dalarna is estimated at 214.6 M SEK.

Table 12. Total indirect economic impact in millions SEK

<table>
<thead>
<tr>
<th>Economic impact</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total indirect economic contribution</td>
<td>254.2</td>
</tr>
<tr>
<td>Regional visitors’ indirect economic</td>
<td>39.6</td>
</tr>
<tr>
<td>contribution</td>
<td></td>
</tr>
<tr>
<td>Total indirect economic impact</td>
<td>214.6</td>
</tr>
</tbody>
</table>

Source: Own Calculation

Regional Economic Impact

The regional economic impact is estimated at 321 MSEK, by the summation of direct and indirect economic impact (Table 13). However, the above analysis is not comprehensive. There are certain assumptions that need to be considered in order to estimate the actual economic impact of the event and to avoid estimation errors. To begin with, the cost of the tickets and the cost of travelling to the destination are excluded from the analysis. The revenues of these two categories did not remain within the region.

Table 13. Regional Economic impact in millions SEK

<table>
<thead>
<tr>
<th>Economic impact</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>106.4</td>
</tr>
<tr>
<td>Indirect</td>
<td>214.6</td>
</tr>
<tr>
<td>Regional economic</td>
<td>321</td>
</tr>
<tr>
<td>impact</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own calculation

Subsequently, the analysis should be investigated for the existence of ‘leakages’. There are suspicions of ‘leakages’ in both direct and indirect economic impact. First, the spending in tourism goods and services inside and outside the venue of the event must be examined for the existence of suppliers outside of the region. Further, the local trip cost is divided in public transportation and taxi services. The amount of money spent in public transportation should be deducted. The income of the employees (e.g. the driver) will not change if the revenue of public
transportation increase during the days of the event. In addition to this, the taxi services need to be examined, with the alternatives of the drivers being employees or freelancers. In the case of freelancers, there might be an increment in the income of the professionals. In the case of the taxi drivers being employees, then the origin of the company needs to be defined. If the company is not from the region, then the local trip costs should be excluded from the calculations. Finally, the accommodation cost should be investigated, in order to identify whether the origin of the lodging type was within the boundaries of the region.

Since the amounts of ‘leakages’ are deducted from the total amount, the regional economic impact can be estimated. This amount represents the spending of the tourists. The economic contribution of regional visitors has been deducted already (Table 10 and Table 12). Within this paper, owing to limitations of data, a sensitivity analysis is performed with three alternative scenarios (Lejarraga and Walkenhorst, 2010). The first case is characterized as small, with a 20% of ‘leakages’ assumed. The second scenario includes a medium case of 50% ‘leakages’. Finally, the third scenario is an extreme case of ‘leakages’, with a 90% of the visitors’ spending, flow out the local economy. These percentages are applied to the regional economic impact from Table 12. The results of this process are presented in Table 13, with the three hypothetical scenarios, respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scenario A</th>
<th>Scenario B</th>
<th>Scenario C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional economic impact</td>
<td>321</td>
<td>321</td>
<td>321</td>
</tr>
<tr>
<td>Leakages</td>
<td>64.2</td>
<td>160.5</td>
<td>288.9</td>
</tr>
<tr>
<td>Total Regional Economic Impact</td>
<td>256.8</td>
<td>160.5</td>
<td>32.1</td>
</tr>
</tbody>
</table>

Source: Own calculation

The results of Table 14 estimated the regional economic impact for the region of Dalarna due to the organization of the FIS Nordic World Ski Championship Falun 2015 in three hypothetical scenarios. The actual regional economic impact of the event is predicted to be between the two values of the scenarios A and C, because the existence of ‘leakages’ in the organization of such events cannot be avoided. The remarkable point of the analysis is that the probabilities of positive outcome for the region of Dalarna due to the organization of the event
are considered as high. The event will have a negative impact for the host-city with a percentage of ‘leakages’ more than 90%.

The induced economic impact
The last element of the regional economic impact is the induced economic impact. This factor measures the amount of money that was spent within the region by the locals from the income that they gained as a result of the organization of the event. Although the calculation of the induced economic impact is impossible with the existing information, a guideline of calculations is provided. A research on the level of the local income ex-ante and ex-post the event is suggested. In the case of changes in the level of income, further analysis is required in order to compute the percentage of this change that is related to the event. This should be conducted with the usage of the calculations of the direct and indirect economic impacts. Further, a multiplier can be applied for the calculation of the induced economic impact. The income of the locals is not the only factor that can be investigated for induced impacts. The revenues of the local businesses or the labour market are also affected by the organization of the event. In practice, the multipliers are provided by an external source (Miller, 2007). Further, the induced impact contains the effects in other sectors. The focus of this analysis consumption in the tourism sector. The calculated regional economic impact contains exclusively expenditures in tourism goods and services. Thus, an attempt to estimate the employment effect in the sector is following. The official report of IPSOS (2015) estimated the consumption in the tourism sector at 311 M SEK, which created 200 full time jobs in the sector. If the estimated number of full time jobs is divided by the turnover of the tourism sector, the employment intensity is defined at 0.64. In Table 15, there is the consumption in every tourism category and the number of full time jobs that were created in each category. However, the analysis should be investigated for all the considerations that discussed regarding the employment effect.
Table 15. The employment effect on the tourism sector

<table>
<thead>
<tr>
<th>Category</th>
<th>Turnover in millions SEK</th>
<th>No. of full time jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenses during the day</td>
<td>9.5</td>
<td>6.1</td>
</tr>
<tr>
<td>Restaurant and coffee</td>
<td>14.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Food and snacks</td>
<td>6.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Shopping and souvenirs</td>
<td>13.2</td>
<td>8.4</td>
</tr>
<tr>
<td>Ski equipment</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>Outside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenses during the day</td>
<td>2.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Restaurants and coffee</td>
<td>21.8</td>
<td>14</td>
</tr>
<tr>
<td>Food and snacks</td>
<td>17.8</td>
<td>11.4</td>
</tr>
<tr>
<td>Shopping and souvenirs</td>
<td>5.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Ski equipment</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Accommodation</td>
<td>200.2</td>
<td>128.1</td>
</tr>
<tr>
<td>Local trip</td>
<td>17.9</td>
<td>11.4</td>
</tr>
<tr>
<td>Total</td>
<td>310.7</td>
<td>198.7</td>
</tr>
</tbody>
</table>

Source: Own Calculation

4.4 Findings

During this analysis the economic activity in the tourism sector was emphasized. The economic impact of the event to the region of Dalarna was estimated at 321 M SEK. This amount represents the direct and indirect economic impact for the host-city, 106.4 M SEK and 214.6 M SEK, respectively. From this amount the economic contribution of the regional visitors, calculated at 60.1 M SEK, is deducted. Further, a sensitivity analysis was performed, in order to investigate the data regarding the issue of ‘leakages’. Three scenarios were selected with 20, 50 and 90 percentages of ‘leakages’. The sensitivity analysis indicated that the regional economic impact is estimated for the three scenarios at 256.8, 160.5 and 32.1 M SEK, respectively. Finally, an estimate of the employment effect was conducted using the information from the report of IPSOS (2015). The employment intensity was estimated at 0.64, according to the estimated number of full time jobs and the turnover in the tourism sector. Subsequently, the employment effect for each tourism category was calculated.
5. Discussion and conclusions

This thesis attempted to estimate the regional economic impact of the FIS Nordic World Ski Championship Falun 2015 to the host-city, the region of Dalarna. The segmentation approach was used in the analysis. This method is widely used in the economic impact studies of tourism and mega-events and is based on visitors’ spending. The measurement of the economic impact of sports mega-events concerns the public, the authorities and the professionals. The development of the tourism sector and the investment of public funds motivate the research on the topic. The first chapter of the paper introduced the topic and reviewed previous studies. Further, the demand for sports mega-events and the economic impact analysis were described. The analysis focused on the economic activity at the tourism sector. The aim of the analysis was to estimate the direct, indirect and induced economic impacts of the event to the host-city.

The direct and indirect economic impacts were calculated at 106.4 and 214.6 M SEK, respectively. These amounts constitute the regional economic impact, which is, thus, calculated at 321 M SEK. Further, a sensitivity analysis was performed with three hypothetical scenarios. The analysis indicated that the economic impact of the event is estimated to be positive for the local economy. It is highly unlikely that the event will produce a negative outcome for the region of Dalarna. This will occur with a percentage of ‘leakages’ higher than 90%. Additionally, a process of calculating the induced economic impact was suggested and the employment effect of the event to the tourism sector was estimated. For the purpose of estimating the employment effect in tourism sector, the report of IPSOS (2015) was used and certain adjustments were applied.

The above analysis is subjected to some avoidable limitations. First, the amount of taxes is included in the final calculations. Further, within this paper the issue of ‘leakages’ is not investigated in practice. Due to lack of information, the analysis was conducted assuming the existence of ‘leakages’, owing to the type of the event. An appropriate analysis requires investigation of ‘leakages’ regarding the ownership of the vendors inside and outside the venue of the event, the expenditures of the visitors in the transportation within the region and whether the accommodation choices were located within the region. Moreover, this study is focused on the economic impact of the event on the tourism sector. However, only a part of the sector is analysed. A comprehensive analysis would have considered the economic impact for all the tourism goods and services and the other sectors of the local economy. Finally, the estimation
of employment effect is subjective. The numbers were taking from the report of IPSOS (2015), however the process of calculating was not accessed.

Further research is recommended for a comprehensive analysis of the economic impact of the event to the host-city. To begin with, all the sectors of the local economy should be investigated. Further, the investigation of ‘leakages’ is crucial for the analysis, in order the estimation of the economic impact to be realistic. Additionally, the cost of the organization of the event for the host-city must be discussed. Lastly, research is required for the long term effects of the event to the host-city.

The project of the organization of the FIS Nordic World Ski Championship Falun 2015 lasted 5 years. The cost of the project is estimated at 265.7 M SEK. This amount includes constructions, maintenance, employees, security, transportations, social media and many more factors (FIS, 2015). The cost of the event was funded by public sources, thus, the analysis of the economic impact of the event is necessary. Initially, the cost of the investments should be investigated and the possible benefits must be analysed. All the factors that included in the project are associated with additional costs and benefits. For instance, the construction or renovation of the sports facilities could benefit the locals but also can promote the tourism sector for the host-city after the event. Another example is the construction or the improvement in the transportations. On the other hand, the host-city might require investments in other sectors or some of the local business were damaged during the construction period. Moreover, there are intangible costs and benefits that should be investigated also, such as social or environmental issues. The amount of inhabitants that left the region, due to the occasion of the event is an example of intangible social cost. In addition to this, the amount of regular tourists that cancelled or postponed their visit to the region, owing to the event (Preuss, 2005). The economic value of the intangible effects of the event to the host-city and the inhabitants must, at least, be approached.

The final aspect that must be investigated regarding the economic impact of the event is the duration of its effects. Both occasions of the costs and the benefits has unlimited examples and will occur in the long term. The operation cost of the sport facilities, the damage of the sport facilities from incorrect maintenance, pollution, rejection of more important projects for the public, investments from the professionals due to the expectations of tourists and many more could be assumed as long term costs of the event. On the other hand, the event could be
beneficial for the host-city in the long term as well. First, the involvement of the local society, the volunteering and the feeling of pride for the locals are intangible benefits. Further, the boost of the sectors of the economy, such as the tourism sector and the improvement of services, such as transportations, are benefits for the host-city. The long term effects of the event can be measured with the Cost Benefit Analysis (CBA). This method, define the duration of the effects, identify the costs and benefits and the people that are involved, attach a monetary value for the effects and calculate the value of the project (Boardman, 2014).

This paper is a useful tool for the extension of the economic impact analysis and further research. Moreover, the results can be used in the decision making process by the event organizers, the professionals of the tourism sector or the authorities in future organization of similar events by the host-city.
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Appendix 1

Defining the study region

The region of the study case is the region of Dalarna, which is defined with the usage of the map from the Country Administrative Board of Dalarna. The map is available from: http://www.lansstyrelsen.se/dalarna/SiteCollectionImages/Sv/manniska-och-samhalle/krisberedskap/dalarna_kommuner.png. [Accessed 12 May 2016]
Appendix 2

Lodging types
The figure A1 presents the share of the visitors for the type of accommodation. There are more than seven different types of lodging. The majority of the visitors stayed at their own houses while visiting the event. This is explained from the fact that the host-city is easily accessible by many cities in Sweden. Further, a lot of visitors visited friends and family due to the occasion of the event.

Figure A1: Lodging types (1-Home, 2-Family and friends, 3-Hostel, 4-rented cottage, 5-Hotel, 6-Rented house or apartment, 7- Other types of accommodation)
Source: Own calculation